



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: TAUBER et. al

Serial No.: 09/845,108

Filed: April 26, 2001

For: RARE EARTH METAL COMPOUNDS FOR USE IN HIGH CRITICAL
TEMPERATURE THIN FILM SUPER-CONDUCTORS, FERROELECTRICS,
PYROELECTRICS, PIEZOELECTRICS, AND HYBRIDS

Attorney Docket No.: CECOM-5469

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AMENDMENTS TO THE CLAIMS

Sir, in response to the Office Action dated May 29, 2003, Paper No. 15 and in accordance with enclosed Remarks and the Revised Amendment Format, please amend the above-identified application as follows:

1-4. Cancel these claims.

5. (Withdrawn) The dielectric substrate, according to claim 3, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.87;

said dielectric substrate having a low dielectric constant between 14.3 and 15.9; and

said dielectric substrate having a low dielectric loss less than 1×10^{-3} .

6. Cancelled.

7. (Currently Amended) ~~A The dielectric substrate, according to claim 6, of the general formula Sr_2RESbO_6 , further comprising:~~

~~said RE being Ytterbium;~~

~~said dielectric substrate being constructed of Sr_2YbSbO_6 ;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-30} m³;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400° C and 1600 °~~

~~C;~~

said dielectric substrate is constructed in a bulk form;
said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 5.1; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.

8. (Withdrawn) The dielectric substrate, according to claim 6, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.86;

said dielectric substrate having a low dielectric constant between 4.8 and 5.4; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

9. Canceled.

10. (Currently Amended) ~~A The dielectric substrate, according to claim 9, of the general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

said RE being Thulium;

said dielectric substrate being constructed of $\text{Sr}_2\text{TmSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 .

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 10.0; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3} without a phase transition.

11. (Withdrawn) The dielectric substrate, according to claim 9, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrates having a density GM/CC of 6.77;

said dielectric substrate having a low dielectric constant between 9.5 and 10.5; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3} .

12. Canceled.

13. (Currently Amended) ~~A The dielectric substrate, according to claim 12, of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:

said RE being Erbium;

said dielectric substrate being constructed of $\text{Sr}_2\text{ErSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

\AA^3 .

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline
structure;

said dielectric substrate having a low dielectric constant of 5.3; and

said dielectric substrate having a low dielectric loss of less than 1.6×10^{-3} without a phase
transition.

14. (Withdrawn) The dielectric substrate according to claim 12 wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 4.1; and

said dielectric substrate having a low dielectric loss of 3.2×10^{-3} .

15. Canceled

16. (Currently Amended) ~~A The dielectric substrate, according to claim 15, of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

5 ~~said RE being Holmium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{HoSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2~~

~~\AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°~~

10 ~~$^\circ\text{C}$;~~

~~said dielectric substrate is constructed in a bulk form;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;~~

~~said dielectric substrate having a low dielectric constant of 11.6; and~~

15 ~~said dielectric substrate having a low dielectric loss of about 3.1×10^{-3} without a phase transition.~~

17. (Withdrawn) The dielectric substrate, according to claim 15, wherein:

~~said dielectric substrate is constructed in a thin film structure;~~

20 ~~said dielectric substrates having a density GM/CC of 6.64;~~

~~said dielectric substrate having a low dielectric constant between 11.1 and 12.2; and~~

~~said dielectric substrate having a low dielectric loss of 3.1×10^{-3} .~~

18. Canceled

25 19. (Currently Amended) ~~A The dielectric substrate, according to claim 18, of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

~~said RE being Dysprosium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{DySbO}_6$;~~

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a bulk form;
said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 11.2; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.

20. (Withdrawn) The dielectric substrate, according to claim 18, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.56;

said dielectric substrate having a low dielectric constant between 10.6 and 11.8; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

21. Canceled.

22. (Currently Amended) ~~A The dielectric substrate , according to claim 21, of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:

said RE being Terbium;

said dielectric substrate being constructed of $\text{Sr}_2\text{TbSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 12.9; and

said dielectric substrate having a low dielectric loss of 1.4×10^{-3} without a phase

5 transition.

23. (Withdrawn) The dielectric substrate, according to claim 21, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 4.6; and

10 said dielectric substrate having a low dielectric loss of 4.0×10^{-3} .

24. Canceled.

25. (Currently Amended) ~~A dielectric substrate, according to claim 21, of the~~
15 ~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

~~said RE being Yttrium;~~

~~said dielectric substrate being constructed of Sr_2YSbO_6 ;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;~~

20 ~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a bulk form;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;~~

25 ~~said dielectric substrate having a low dielectric constant of 7.1; and~~

~~said dielectric substrate having a low dielectric loss of 1.4×10^{-3} without a phase transition.~~

26. (Withdrawn) The dielectric substrate, according to claim 24, wherein:

said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a density GM/CC of 5.91;
said dielectric substrate having a low dielectric constant between 6.7 and 7.5; and
said dielectric substrate having a low dielectric loss of about 1.4×10^{-3} .

27. Canceled.

28. (Currently Amended) ~~A The dielectric substrate, according to claim 27, of the
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

~~said RE being Lanthanum;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{LaSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} .~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a bulk form;~~

~~said dielectric substrate having an ordered perovskite cubic crystalline structure;~~

~~said dielectric substrate having a low dielectric constant of 16.3; and~~

~~said dielectric substrate having a low dielectric loss of 3.8×10^{-3} without a phase transition.~~

29. (Withdrawn) The dielectric substrate according to claim 27 wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 5.19.

said dielectric substrate having a low dielectric constant between 14.5 and 16.1; and

said dielectric substrate having a low dielectric loss of about 3.8×10^{-3} .

30. Canceled.

31. (Currently Amended) ~~A The dielectric substrate, according to claim 30, of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

~~said RE being Gadolinium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{GdSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a bulk form;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;~~

~~said dielectric substrate having a low dielectric constant of 12.1; and~~

~~said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.~~

32. (Withdrawn) The dielectric substrate, according to claim 30, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 6.0; and

said dielectric substrate having a low dielectric loss of 9.0×10^{-3} .

33. Canceled.

34. (Currently Amended) ~~A The dielectric substrate, according to claim 33, of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

~~said RE being Samarium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{SmSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C .~~

C;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 13.6; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.

35. (Withdrawn) The dielectric substrate, according to claim 33, wherein:

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a low dielectric constant of 8.8; and

said dielectric substrate having a low dielectric loss of 9.0×10^{-3} .

36. Canceled.

37. (Currently Amended) ~~A The dielectric substrate, according to claim 36, of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:

said RE being Praseodymium;

said dielectric substrate being constructed of $\text{Sr}_2\text{PrSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

C;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 10.9; and

said dielectric substrate having a low dielectric loss of 2.2×10^{-3} without a phase transition.

38. (Withdrawn) The dielectric substrate, according to claim 36, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrates having a density GM/CC of 6.02;
5 said dielectric substrate having a low dielectric constant between 10.4 and 11.4; and
said dielectric substrate having a low dielectric loss of about 2.2×10^{-3} .

39. Canceled.

10 40. (Currently Amended) ~~The dielectric substrate, according to claim 39, of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~
~~said RE being Europium;~~
~~said dielectric substrate being constructed of $\text{Sr}_2\text{EuSbO}_6$;~~
~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2~~
15 ~~\AA^3 .~~
~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°~~
 ~~C ;~~
~~said dielectric substrate is constructed in a bulk form;~~
20 ~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline~~
~~structure;~~
~~said dielectric substrate having a low dielectric constant of 14.6; and~~
~~said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase~~
~~transition.~~

25 41. (Withdrawn) The dielectric substrate, according to claim 39, wherein:
said dielectric substrate is constructed in a thin film structure;
said dielectric substrate having a low dielectric constant of 4.6; and
said dielectric substrate having a low dielectric loss of 2.0×10^{-3} .

42. Canceled.

43. (Currently Amended) A ~~The~~ dielectric substrate, ~~according to claim 42, of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:

5 said RE being Neodymium;

said dielectric substrate being constructed of $\text{Sr}_2\text{NdSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

10 $^\circ\text{C}$;

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure;

said dielectric substrate having a low dielectric constant of 10.6; and

15 said dielectric substrate having a low dielectric loss of 2.9×10^{-3} without a phase transition.

44. (Withdrawn) The dielectric substrate, according to claim 42, wherein:

 said dielectric substrate is constructed in a thin film structure;

20 said dielectric substrate having a density GM/CC of 6.13;

 said dielectric substrate having a low dielectric constant between 10.1 and 11.1; and

 said dielectric substrate having a low dielectric loss of about 2.9×10^{-3} .

45. (Withdrawn) A thin film high T_c structure, comprising:

25 a plurality of thin films constructed of a compound of the general formula $\text{Sr}_2\text{RESbO}_6$
 wherein RE is a rare earth metal;

 said plurality of thin films being interspersed with a plurality of layers constructed of a
copper oxide superconductor;

 said plurality of thin films being deposited by pulsed laser deposition and being heated for

at least 20 hours at between 750° C to 825° C;

said plurality of thin films having a low dielectric constant;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

said plurality of thin films having a low dielectric loss without a phase transition.

46. (Withdrawn) A thin film high critical temperature superconductor structure, according to claim 45, further comprising:

said plurality of thin films are constructed of $\text{Sr}_2\text{LuSbO}_6$;

said plurality of thin films being heated for at least 20 hours at between 750° C to 825° C;

and

said plurality of layers are constructed of $\text{YBa}_2\text{Cu}_3\text{O}_{7-8}$.

47. (Withdrawn) A thin film high critical temperature superconductor structure, according to claim 45, further comprising:

said plurality of thin films are constructed of $\text{Sr}_2\text{LaSbO}_6$; and

said plurality of layers are constructed of $\text{YBa}_2\text{Cu}_3\text{O}_{7-8}$.

48. (Withdrawn) An antenna, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate of the formula $\text{Sr}_2\text{LuSbO}_6$;

said single crystal substrate having a low dielectric constant;

said single crystal substrate having a low dielectric loss without a phase transition;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

said single layer of a copper oxide superconductor being patterned to complete the device.

49. (Withdrawn) A superconductor insulator superconductor step edge Josephson junction, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate

of the formula $\text{Sr}_2\text{YbSbO}_6$;

said single crystal substrate having a low dielectric constant;

said single crystal substrate having a low dielectric loss without a phase transition;

said single layer of a copper oxide superconductor being patterned;

5 a second layer of $\text{Sr}_2\text{YbSbO}_6$ deposited onto said single layer of a copper oxide superconductor;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

a second layer of a copper oxide superconductor deposited and patterned on said second layer of $\text{Sr}_2\text{YbSbO}_6$.

10 -49.

50. Canceled.